Creating Web Services
Session 624

Creating Web Services

Karl Hsu and Ron Lue-Sang
WebObjects Engineering
webobjects@apple.com

What You'll Learn

- Web Services
  - Brief technology description (what)
  - Practical applications (why)
- WebObjects and Web services (how)
  - WO as a server
  - WO as a client
  - Direct to Web Services

What Are Web Services?

- Remote Procedure Calls (RPC) for the Internet era
  - XML based
- Lots of standards/specs
  - Description (WSDL)
  - Discovery (UDDI)
  - Encoding (SOAP)
  - Transport (HTTP, SMTP)

Parts of a Web Service

- WSDL—the contract that defines where, when, what, how (Interface)
- Service—a set of Operations and invocation information (Class)
- Operations—a particular action supported by a service (Method)

Quick Look at WSDL

- Web Services Definition Language
- XML for defining RPC structure of a Web service
  - Data types
  - Message types
  - Available operations
  - Location
  - Transport bindings

Quick Look at SOAP

- Simple Object Access Protocol
- XML message protocol for Web services
  - Defines message layout (envelope, header, body,…)
  - Standard describes various transport protocols (HTTP, SMTP,…)
  - Supports synchronous and asynchronous modes
- Two “styles”
  - RPC
  - Document

Examples—RPC

- RPC—Invoke any method, return any object

```
public class RPCService {
   public String sayHello() {
       return “Hello World”;
   }
}
```

- Document—You do the work

```
public class DocService {
   public Element sayHello(Element anElement) {
       // do work here
       return returnElement;
   }
}
```

Problems Solved by Web Services

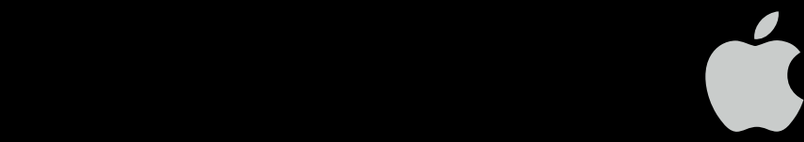
- Clean information transfer
  - Don’t dictate display or usage
  - Information can easily be consumed by other programs (no more screen scraping!)
- Implementation independent
- Firewall friendly

Human Readable

```
<?xml version="1.0" encoding="UTF-8"?>
  <SOAP-ENV:Envelope
    xmlns:xsd="http://www.w3.org/1999/XMLSchema"
    xmlns:xsi="http://www.w3.org/1999/XMLSchema-instance"
    SOAP-ENV:encodingStyle="http://schemas.xmlsoap.org/soap/encoding/"
    xmlns:SOAP-ENV="http://schemas.xmlsoap.org/soap/envelope/"
    xmlns:SOAP-ENC="http://schemas.xmlsoap.org/soap/encoding/">
      <SOAP-ENV:Body>
        <m:addToExecution xmlns:m="http://aHost:55555/cgi-bin/WebObjects/PerformImport.woa/
ws/Performer/wsdl">
          <rdat xsi:type="SOAP-ENC:Dictionary">
            <tcsnumber xsi:type="xsd:int">1001</tcsnumber>
            <tcsname xsi:type="xsd:string">Open Project Quickly</tcsname>
            <tcsdescription xsi:type="xsd:string">Open project via the &apos;open
quickly&apos; menu item command</tcsdescription>
            <verification xsi:type="xsd:string">Verified project path contains word 1 of window
title &apos;CircleView&apos;</verification>
            <tcsresult xsi:type="xsd:boolean">true</tcsresult>
            <timingresult xsi:type="xsd:int">0</timingresult>
            <executablesize xsi:type="xsd:int">0</executablesize>
            <tcstarget xsi:type="xsd:string">/Users/projectbuilder/Documents/CircleView/</
tcstarget>
            <tcsdatestamp xsi:type="xsd:string">2003/04/03 18:28:23 PST</tcsdatestamp>
            <tcscomments xsi:type="xsd:string"></tcscomments>
          </rdat>
          <execnumber xsi:type="xsd:int">39322</execnumber>
        </m:addToExecution>
      </SOAP-ENV:Body>
    </SOAP-ENV:Envelope>
```

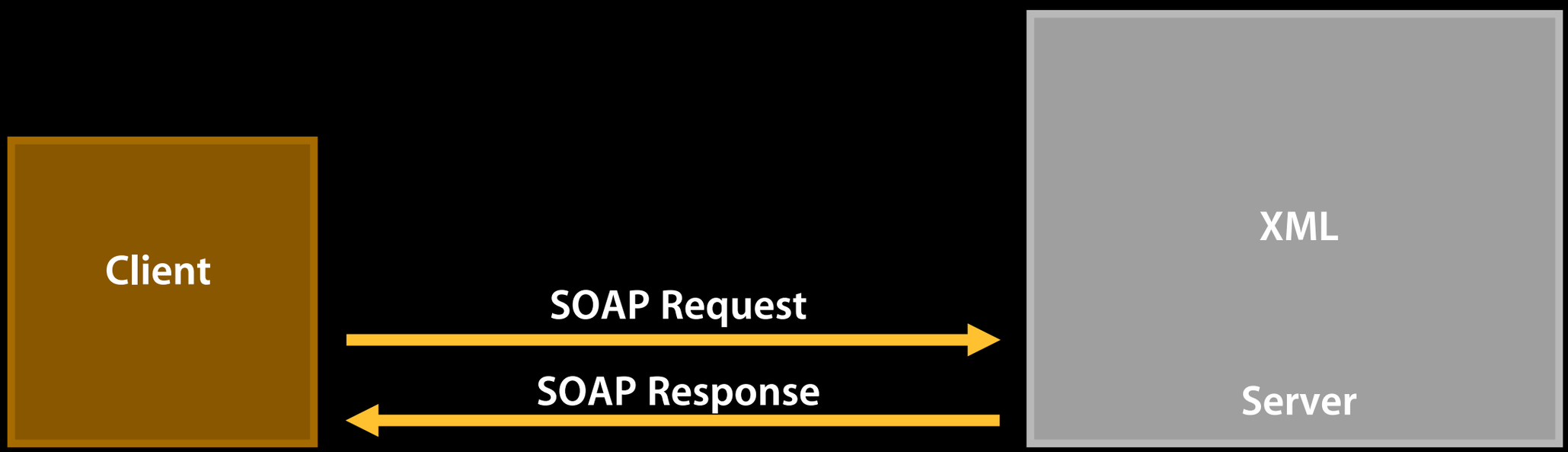
Participants In a Web Service

- Server (Provider)
  - Registers with a directory (UDDI)
  - Publishes WSDL to describe service
  - Provides the Web service
- Client (Consumer)
  - Finds Web services in a directory (UDDI)
  - Configured using WSDL
  - Invokes the Web service



Web Service Event Flow

Web Service Event Flow



WebObjects and Web Services

- We use AXIS
  - Apache eXtensible Interaction System
  - Apache group software (Open Source!)
  - Support for both client and server
  - WSDL Generation
  - WebObjects has plugins for session support and custom (de)serialization of objects
- We've expanded this with Direct to Web Services
  - Patience, young grasshopper…

What We Do For You—1

- We have custom (de)serializers for
  - NSArray, NSData, NSDictionary, NSRange, NSTimeZone, EOEnterpriseObject, EOGlobalID
  - These are automatically registered for you
  - Default WSDL provided for you to use as well

What We Do For You—2

- Session support
  - Custom session handlers installed for both client and server
  - Allows for “conversational” Web services
    - Standard does NOT define transaction semantics
- Dynamic registration
  - Don’t need to edit configuration files
  - `WOWebServiceRegistrar.registerWebService(...)`

Demo

Basic Web Service
Dynamic Registration
Session Support

Karl Hsu
webobjects@apple.com

WebObjects as a Web Service Client

- Convenience API on top of AXIS
- Again, custom (de)serializers are available and registered
- Will automatically participate in sessions
  (with WebObjects hosted services)
- HTTPS can be used on the client to connect

Security

- Current state of the art
  - HTTPS
- Industry standard
  - WS-Security
- We provide a delegate architecture
  - `com.webobjects.webservices.support.WOSecurityDelegate`

Direct to Web Services

Ron Lue-Sang
webobjects@apple.com

Direct to Web Services

- Target CRUD operations
  - Dynamic data access Web service from EOModel
- No code
- Rule-based!

Demo

Direct To Web Services

Ron Lue-Sang

Jamaican-Chinese WebObjects Engineering Cowboy

webobjects@apple.com

D2WS Demo

The D2WS Assistant

- Starts with the WODefaultWebService Web service
- Operation types
- Default operations
- Creating a new service
  - Input and ouput names
- SOAP-Structs
- Creating a new operation

D2WS Demo

- The Rule System
- Frozen operations
- Subclassed operations
  - Invocation
  - Arguments
- WSDL Generation
  - Changing how WSDL generation works

D2WS Transactions

- How do they work?
  - Built on the session support
- Enabling transactions
- Making the most of transactions

Demo

D2WS: Transactions

Ron Lue-Sang
webobjects@apple.com

Deployment

- Load balancing
  - Based on cookie support
- WSDL location
  - Single location is best
- Registration
  - Internal UDDI
  - Web-page
  - Word of mouth

Web Services—Internet RPC

- Lots and lots of acronyms
- Located and registered in a UDDI server
- Described by WSDL
- Sent as SOAP-encoded XML over HTTP (or SMTP, etc)
- WebObjects adds transactions and type support
- Direct to Web Services
  - Automatic and comprehensive Web services for your database

Q&A

Karl Hsu and Ron Lue-Sang

WebObjects Engineering

webobjects@apple.com

http://developer.apple.com/wwdc2003/urls.html

For More Information

Who to Contact

Andreas Wendker
Manager, WebObjects Engineering
webobjects@apple.com

Bob Fraser
Senior Product Manager, WebObjects and Java
webobjects@apple.com

Katherine Wenc
Manager, Technical Publications
webobjects@apple.com

Enterprise-Level WebObjects Support And Consulting
AppleCare Enterprise Services
services@apple.com
(800) 630 2775

http://developer.apple.com/wwdc2003/urls.html

Reference Library

Resources

Product Information

http://www.apple.com/webobjects

Developer Support

http://developer.apple.com/webobjects

Enterprise-Level WebObjects Support And Consulting

http://www.apple.com/services/technicalsupport

http://www.apple.com/services/consulting

Mailing List

WebObjects Announcements

webobjects-announce@apple.com

WWDC 2003

Worldwide Developers Conference